Claims

[Claim 1] A jet grouting method for improving a ground to be treated, the method comprising:

forming a ground improvement body by injecting an improving material into the ground via an injection rod while rotating the injection rod in the ground, the ground improvement body having a sectional shape which is a combination of different kinds of fan shapes having different radiuses, the ground improvement body being formed so as to have an effective wall thickness that is required in design thereof,

wherein the sectional shape of the ground improvement body is a combination of at least two kinds of fan shapes, one of the two kinds corresponding to a fan shape having a smaller radius, and the other corresponding to a fan shape having a larger radius,

wherein the different kinds of fan shapes are arranged in order by radius size in a longitudinal direction of the effective wall thickness while fan shapes having the smallest radius are arranged in a thickness direction of the effective wall thickness, and

wherein the ground improvement body is formed so that:

the effective wall thickness is 0.7 times a maximum diameter of the ground improvement body or smaller,

the minimum diameter of the ground improvement body is 0.2 times to 0.8 times the maximum diameter thereof, and

a/b is 0.9 or smaller, where a is a wall thickness coefficient that is obtained by dividing the effective wall thickness by the

maximum diameter of the ground improvement body, and where *b* is a small-diameter coefficient that is obtained by dividing the minimum diameter of the ground improvement body by the maximum diameter.

[Claim 2] A jet grouting method according to claim 1, wherein a central angle of the fan shape having the smallest radius is determined with respect to the effective wall thickness, and wherein central angles of the fan shapes are determined in ascending order from the fan shape having the smallest radius.

[Claim 3] A jet grouting method according to claim 1 or 2, wherein, when forming the ground improvement body, a rotation speed of the injection rod injecting the improving material is changed stepwisely to control a diameter of the ground improvement body to be formed.

[Claim 4] A jet grouting method according to any one of claims 1-3, wherein the sectional shape of the ground improvement body is a combination of two to five kinds of fan shapes having different radiuses.

[Claim 5] A jet grouting method according to any one of claims 1-4, wherein a jet flow of the improving material injected via the injection rod breaks up and loosens in-situ soil, and wherein the method further comprises:

monitoring the jet flow of the improving material.

[Claim 6] A jet grouting method according to any one of claims 1-5, wherein a plurality of ground improvement bodies are formed to construct a ground improvement structure including the plurality of ground improvement bodies.

[Claim 7] A ground improvement body, which is constructed so as to have an effective wall thickness that is required in design thereof, the ground improvement body comprising:

a sectional shape which is a combination of different kinds of fan shapes having different radiuses,

wherein the sectional shape of the ground improvement body is a combination of at least two kinds of fan shapes, one of the two kinds corresponding to a fan shape having a smaller radius, and the other corresponding to a fan shape having a larger radius,

wherein the different kinds of fan shapes are arranged in order by radius size in a longitudinal direction of the effective wall thickness while fan shapes having the smallest radius are arranged in a thickness direction of the effective wall thickness,

wherein the effective wall thickness is 0.7 times a maximum diameter of the improvement body or smaller,

wherein the minimum diameter of the ground improvement body is set to be 0.2 times to 0.8 times the maximum diameter thereof, and

wherein a/b is 0.9 or smaller, where a is a wall thickness coefficient that is obtained by dividing the effective wall thickness

by the maximum diameter of the ground improvement body, and where *b* is a small-diameter coefficient that is obtained by dividing the minimum diameter of the ground improvement body by the maximum diameter.

[Claim 8] A ground improvement structure, comprising a plurality of ground improvement bodies each of which is as claimed in claim 7 and which are arranged in an overlapping manner.